11/19/13 Agenda

- Warm Up

- Review Homework - Worksheet 2

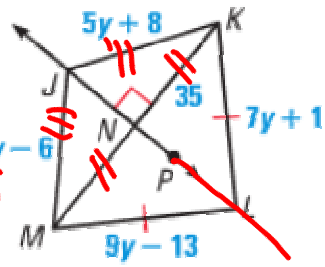
- Section 5.4 - Medians & Altitudes

- Review Test

- Start Homework
    - Worksheet 3 - Altitudes &Medians

## Warm Up

**PERPENDICULAR BISECTORS** In Exercises 11–15, use the diagram. $\overleftrightarrow{JN}$ is the perpendicular bisector of $\overline{MK}$.




11. Find $NM$. 35

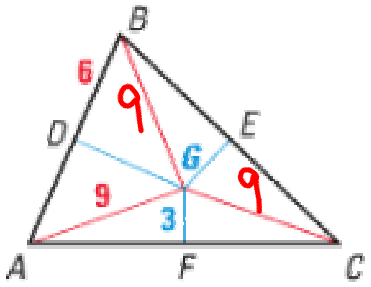
12. Find $JK$. 43 $JM = JK$

13. Find $KL$. 50

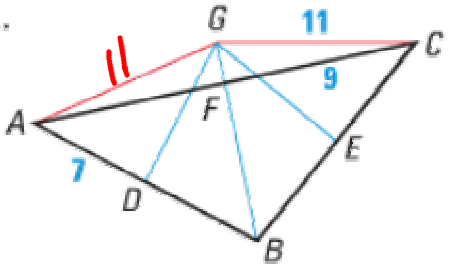
14. Find $ML$. 50 $7y - 6 = 5y + 8$

15. Is $L$ on $\overleftrightarrow{JP}$? *Explain* your reasoning. $y = 7$

Find $BG$.




17. Find $GA$.



## Section 5.4 - Altitudes & Medians — Target 5D & 5E

Goal: Solve problems involving altitudes & medians of a triangle.

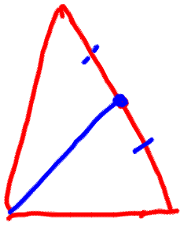
Vocabulary:

Median:

Centroid

Altitude:

Orthocenter



A **median of a triangle** is a segment from a vertex to the midpoint of the opposite side. The three medians of a triangle are concurrent. The point of concurrency, called the **centroid**, is inside the triangle.

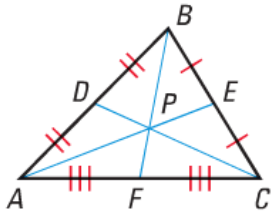
**THEOREM** — *For Your Notebook*

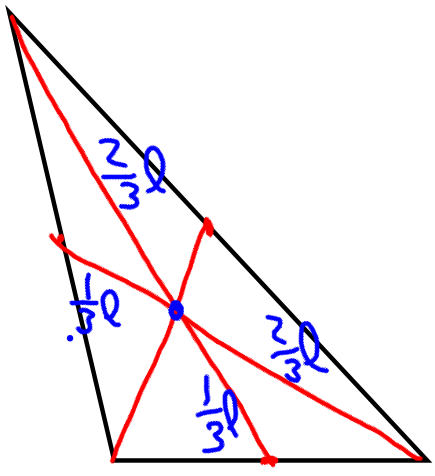
**THEOREM 5.8 Concurrency of Medians of a Triangle**

The medians of a triangle intersect at a point that is two thirds of the distance from each vertex to the midpoint of the opposite side.

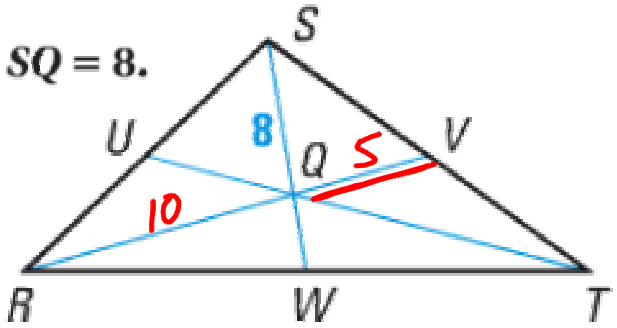
The medians of $\triangle ABC$ meet at $P$ and $AP = \frac{2}{3}AE$, $BP = \frac{2}{3}BF$, and $CP = \frac{2}{3}CD$.

*Proof:* Ex. 32, p. 323; p. 934



**In $\triangle RST$, $Q$ is the centroid and $SQ = 8$. Find $QW$ and $SW$.**




$SQ = \frac{2}{3} SW$

$QW = \frac{1}{3} SW$

$QW = 4$

$SW = 12$

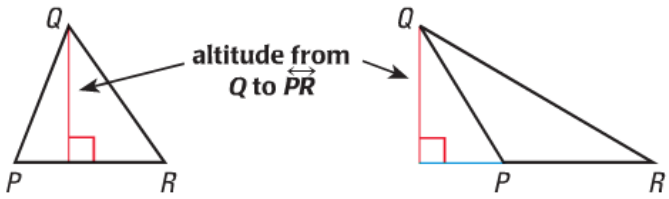
$QV = 5$

$RQ = 10$

$RV = 15$

## Section 5.4 - Altitudes & Medians — Target 5D & 5E

**ALTITUDES** An **altitude of a triangle** is the perpendicular segment from a vertex to the opposite side or to the line that contains the opposite side.



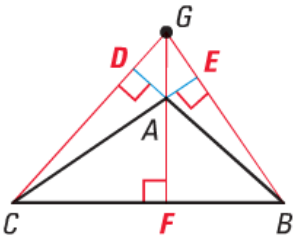

**THEOREM** *For Your Notebook*

**THEOREM 5.9 Concurrency of Altitudes of a Triangle**

The lines containing the altitudes of a triangle are concurrent.

The lines containing $\overline{AF}$, $\overline{BE}$, and $\overline{CD}$ meet at $G$.

*Proof:* Exs. 29–31, p. 323; p. 936

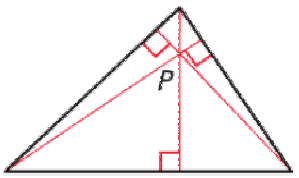



**CONCURRENCY OF ALTITUDES** The point at which the lines containing the three altitudes of a triangle intersect is called the **orthocenter** of the triangle.

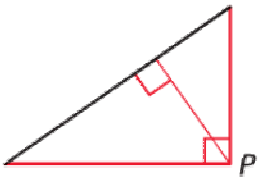
**EXAMPLE 3 Find the orthocenter**

**Find the orthocenter *P* in an acute, a right, and an obtuse triangle.**

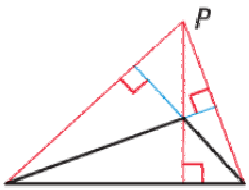
**Solution**




Acute triangle
*P* is inside triangle.




Right triangle
*P* is on triangle.




Obtuse triangle
*P* is outside triangle.

**ISOSCELES TRIANGLES** In an isosceles triangle, the perpendicular bisector, angle bisector, median, and altitude from the vertex angle to the base are all the same segment. In an equilateral triangle, this is true for the special segment from any vertex.